

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

United States Patent and Trademark
Office
(Box PCT)
Crystal Plaza 2
Washington, DC 20231
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

| | |
|----------------------------------------------------------------------|----------------------------------------------------------|
| Date of mailing (day/month/year) 28 January 1999 (28.01.99) | |
| International application No. PCT/US98/10389 | Applicant's or agent's file reference 2873000022PC |
| International filing date (day/month/year) 22 May 1998 (22.05.98) | Priority date (day/month/year) 23 May 1997 (23.05.97) |
| Applicant WONG, John, W. et al | |

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

18 December 1998 (18.12.98)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

| | |
|-----------------------------------------------------------------------------------------------|------------------------------------------|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland | Authorized officer Jean-Marie McAdams |
| Facsimile No.: (41-22) 740.14.35 | Telephone No.: (41-22) 338.83.38 |



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

| | | |
|---------------------------------------------------------|----|------------------------------------------------------------------------------------------------------------------------|
| (51) International Patent Classification: A61M 16/00 | A1 | (11) International Publication Number: WO 98/52635 (43) International Publication Date: 26 November 1998 (26.11.98) |
|---------------------------------------------------------|----|------------------------------------------------------------------------------------------------------------------------|

(21) International Application Number: PCT/US98/10389

(22) International Filing Date: 22 May 1998 (22.05.98)

(30) Priority Data:
60/063,454 23 May 1997 (23.05.97) US

(71) Applicant (for all designated States except US): WILLIAM BEAUMONT HOSPITAL [US/US]; 3601 West 13 Mile Road, Royal Oak, MI 48073-6769 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): WONG, John, W. [CA/US]; 726 Tennyson Downs Court, Bloomfield, MI 48304 (US). JAFFRAY, David, A. [CA/CA]; 2476 Lincoln Road, Windsor, Ontario N8W 2R7 (CA). SHARPE, Michael, B. [CA/CA]; 2066 Vimy Avenue, Windsor, Ontario N8W 1P3 (CA).

(74) Agents: MOGA, Thomas, T.; Harness, Dickey & Pierce, P.L.C., Suite 400, 5445 Corporate Drive, Troy, MI 48098 (US) et al.

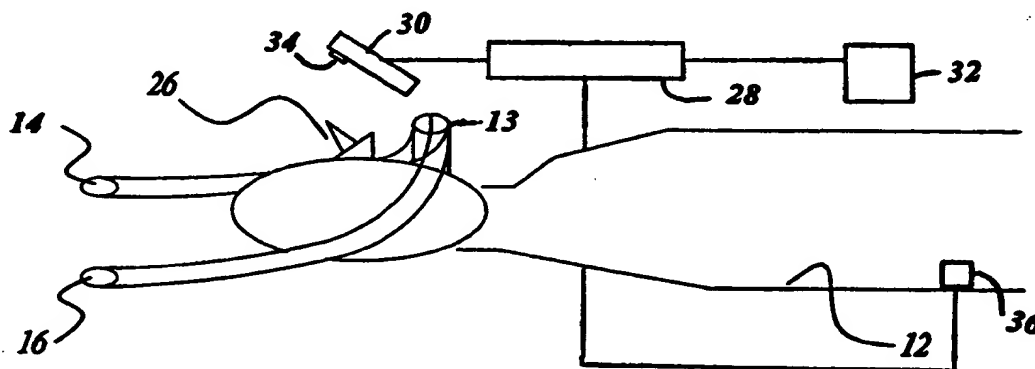
(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published

With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: METHOD AND APPARATUS FOR DELIVERING RADIATION THERAPY DURING SUSPENDED VENTILATION



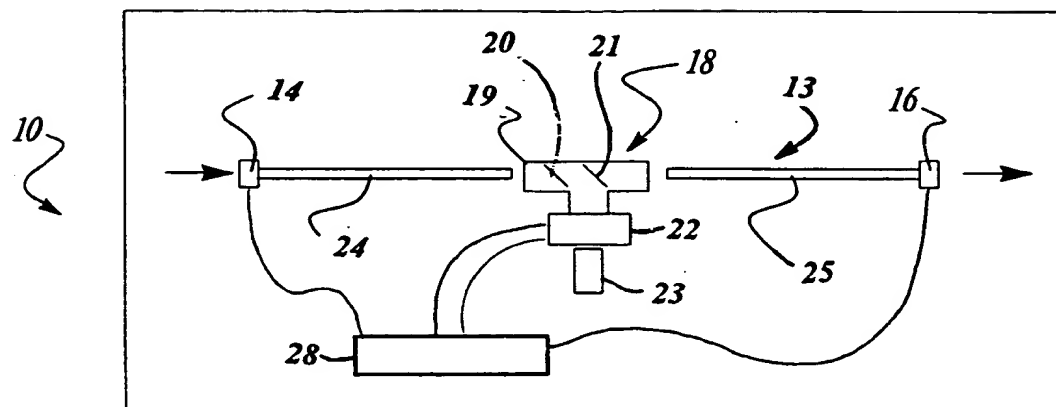
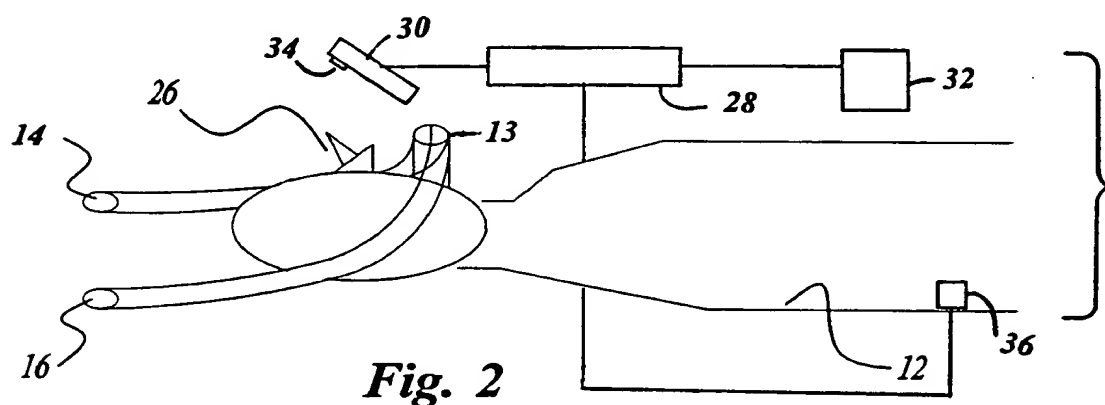
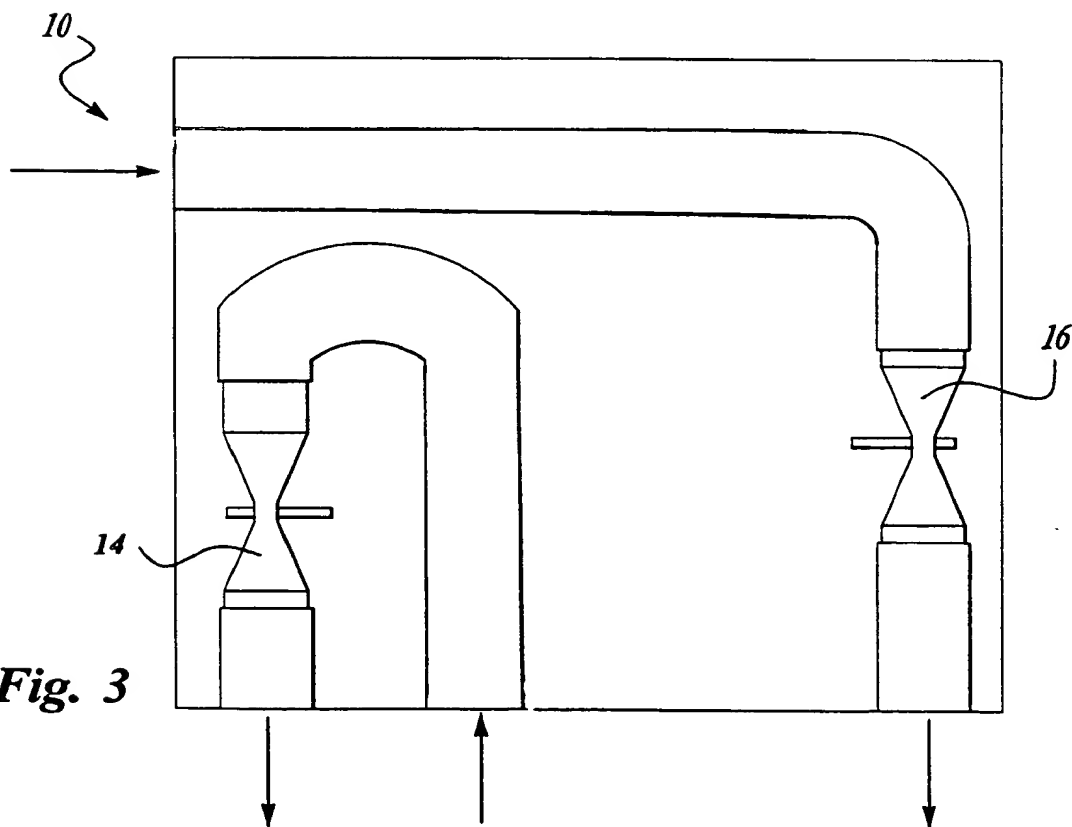
(57) Abstract

The present invention is a method for delivering a radiation therapy to a patient (12) during breath hold when the ventilation is suspended. A computer (28) controls the inhalation, exhalation, suspending the breathing at a predetermined flow direction, and lung volume for a duration which is tolerated by a patient.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

| | | | | | | | |
|----|--------------------------|----|------------------------------------------|----|----------------------------------------------|----|--------------------------|
| AL | Albania | ES | Spain | LS | Lesotho | SI | Slovenia |
| AM | Armenia | FI | Finland | LT | Lithuania | SK | Slovakia |
| AT | Austria | FR | France | LU | Luxembourg | SN | Senegal |
| AU | Australia | GA | Gabon | LV | Latvia | SZ | Swaziland |
| AZ | Azerbaijan | GB | United Kingdom | MC | Monaco | TD | Chad |
| BA | Bosnia and Herzegovina | GE | Georgia | MD | Republic of Moldova | TG | Togo |
| BB | Barbados | GH | Ghana | MG | Madagascar | TJ | Tajikistan |
| BE | Belgium | GN | Guinea | MK | The former Yugoslav Republic of Macedonia | TM | Turkmenistan |
| BF | Burkina Faso | GR | Greece | | | TR | Turkey |
| BG | Bulgaria | HU | Hungary | ML | Mali | TT | Trinidad and Tobago |
| BJ | Benin | IE | Ireland | MN | Mongolia | UA | Ukraine |
| BR | Brazil | IL | Israel | MR | Mauritania | UG | Uganda |
| BY | Belarus | IS | Iceland | MW | Malawi | US | United States of America |
| CA | Canada | IT | Italy | MX | Mexico | UZ | Uzbekistan |
| CF | Central African Republic | JP | Japan | NE | Niger | VN | Viet Nam |
| CG | Congo | KE | Kenya | NL | Netherlands | YU | Yugoslavia |
| CH | Switzerland | KG | Kyrgyzstan | NO | Norway | ZW | Zimbabwe |
| CI | Côte d'Ivoire | KP | Democratic People's Republic of Korea | NZ | New Zealand | | |
| CM | Cameroon | | | PL | Poland | | |
| CN | China | KR | Republic of Korea | PT | Portugal | | |
| CU | Cuba | KZ | Kazakhstan | RO | Romania | | |
| CZ | Czech Republic | LC | Saint Lucia | RU | Russian Federation | | |
| DE | Germany | LI | Liechtenstein | SD | Sudan | | |
| DK | Denmark | LK | Sri Lanka | SE | Sweden | | |
| EE | Estonia | LR | Liberia | SG | Singapore | | |

**Fig. 1****Fig. 2****Fig. 3**

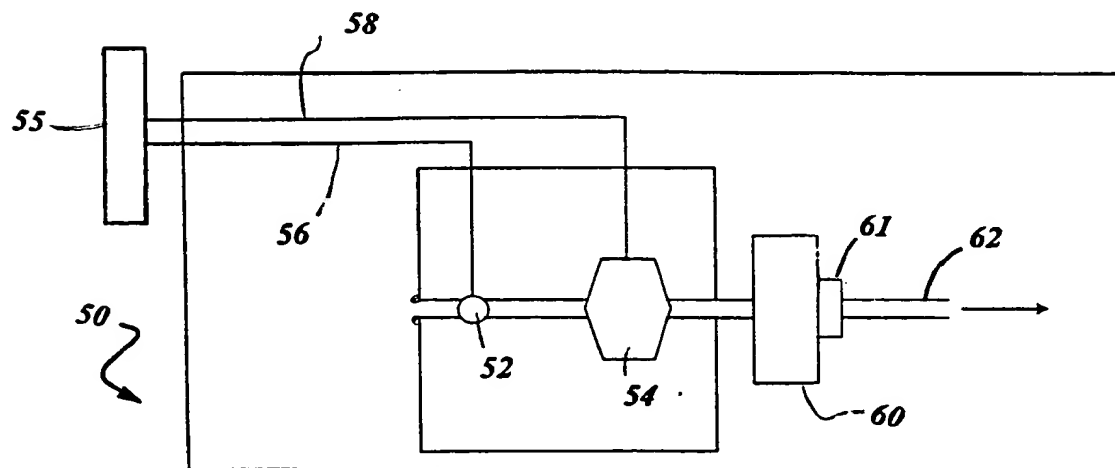
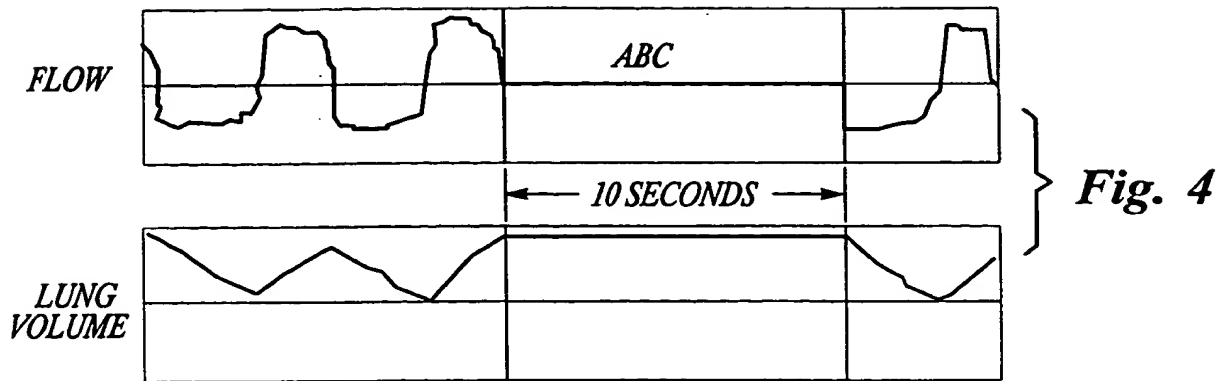
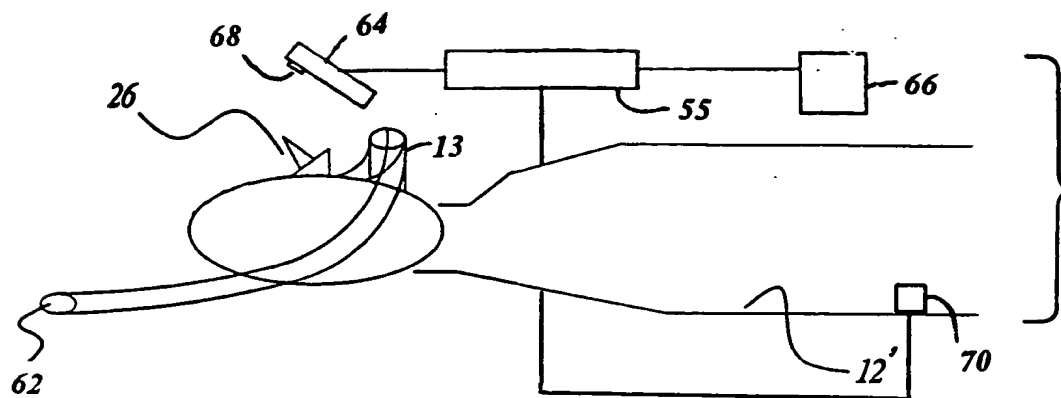
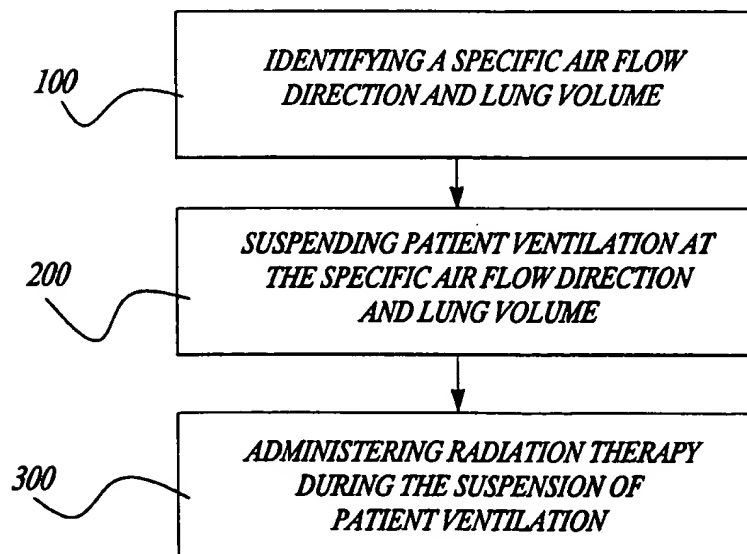


Fig. 5

**Fig. 6****Fig. 7**

PATENT COOPERATION TREATY

PCT

REC'D 06 APR 1999

WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Arti 1 36 and Rule 70)

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Applicant's or agent's file reference 2873000022PC | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/US98/10389 | International filing date (day/month/year) 22 MAY 1998 | Priority date (day/month/year) 23 MAY 1997 |
| International Patent Classification (IPC) or national classification and IPC IPC(6): A61M 16/00; and US Cl.: 128/200.24, 204.21, 204.23, 207.14; 604/20 | | |
| Applicant WILLIAM BEAUMONT HOSPITAL | | |

| |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36. |
| 2. This REPORT consists of a total of <u>3</u> sheets. <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of <u>0</u> sheets. |
| 3. This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step or industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Date of submission of the demand 18 DECEMBER 1998 | Date of completion of this report 26 FEBRUARY 1999 |
| Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230 | Authorized officer <i>Virendra Srivastava</i> VIRENDRA SRIVASTAVA Telephone No. (703) 308-0959 |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/10389

I. Basis of the report

1. This report has been drawn on the basis of (*Substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments*):

- ☒ the international application as originally filed.
- ☒ the description, pages 1-17, as originally filed.
pages NONE, filed with the demand.
pages NONE, filed with the letter of _____.
pages _____, filed with the letter of _____.
- ☒ the claims, Nos. 1, as originally filed.
Nos. NONE, as amended under Article 19.
Nos. NONE, filed with the demand.
Nos. NONE, filed with the letter of _____.
Nos. _____, filed with the letter of _____.
- ☒ the drawings, sheets/fig 1-3, as originally filed.
sheets/fig NONE, filed with the demand.
sheets/fig NONE, filed with the letter of _____.
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE.
- ☒ the claims, Nos. NONE.
- ☒ the drawings, sheets/fig NONE.

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the ~~Supplemental Box~~ Additional observations below (Rule 70.2(c)).

4. Additional observations, if necessary:

NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US98/10389

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. STATEMENT**

| | | |
|-------------------------------|--------------------|-----|
| Novelty (N) | Claims <u>1</u> | YES |
| | Claims <u>NONE</u> | NO |
| Inventive Step (IS) | Claims <u>1</u> | YES |
| | Claims <u>NONE</u> | NO |
| Industrial Applicability (IA) | Claims <u>1</u> | YES |
| | Claims <u>NONE</u> | NO |

2. CITATIONS AND EXPLANATIONS

Claim 1 meets the criteria set out in PCT Article 33(2)-(4) because the prior art does not teach or fairly suggest the method of ventilation during radiation therapy.

----- NEW CITATIONS -----
NONE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/10389

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : A61M 16/00

US CL : 128/200.24, 204.21, 204.23, 207.14; 604/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 128/204.23, 204.21, 207.14, 200.24; 604/20

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|------------------------------------------------------------------------------------|-----------------------|
| A | US 5,558,086 A (SMITH et al) 24 September 1996, col. 6 lines 33-60. | 1 |



Further documents are listed in the continuation of Box C.



See patent family annex.

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| * Special categories of cited documents: | * T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| * A* document defining the general state of the art which is not considered to be of particular relevance | * X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| * E* earlier document published on or after the international filing date | * Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| * L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | * A* document member of the same patent family |
| * O* document referring to an oral disclosure, use, exhibition or other means | |
| * P* document published prior to the international filing date but later than the priority date claimed | |

Date of the actual completion of the international search

14 SEPTEMBER 1998

Date of mailing of the international search report

19 OCT 1998

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

VIRENDRA SRIVASTAVA

Telephone No. (703) 308-0959